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Diabetes Family-Inclusion Education in the Outpatient Clinic

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This doctoral project, directed and approved by the candidate's committee, has been accepted by the College of Graduate and Professional Studies of Abilene Christian University in partial fulfillment of the requirements for the degree.

Doctor of Nursing Practice

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School of Nursing

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by

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Dedication

My Daddy, Lenard Lee Emison, deserves to have this capstone project dedication. He lived with Type II Diabetes for many years and died in 2014 due to complications from this debilitating disease. I also dedicate this project to all the diabetes patients whom I have treated over the years.

Acknowledgments

Family is the most vital blessing to me. I wish to share my gratitude for my husband, Brian, for supporting me through all my education and assignments. He is my rock, best friend, and biggest supporter. In addition, I want to thank my boys, Jacob and Adam. Without you, all this hard work would not be possible or so meaningful. I hope you always learn to follow your dreams and never give up; if something does not work out in your time, God's timing is always perfect.

Friends are placed in our lives to encourage and support us through life's challenges. First, I thank Rita Hollingsworth for being a true mentor through this project. Second, I want to thank Heather McFarland for allowing me to conduct research and for helping to convince me to go to nurse practitioner school years ago. Her guidance and friendship through the years have indeed been a blessing. Third, I want to thank Ruth Ann Slayton for guiding me through the program. Finally, I want to thank my sisters, Cindy and Angela, for not giving me a hard time while writing papers at the beach.

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Abstract

Patient education is critical for the regulation of Type II Diabetes. This study evaluated 39 adults ≥ 40 years old with T2D and a HgbA1c level of ≥ 7.0%, including 27 women and 12 men aged 40 to 74. The participants were divided into two separate groups. The first group (19) diagnosed with T2D had no formal disease management education but were given videos on diabetes education to watch alone. The second group (202) was given family-inclusion diabetes education through videos. The hypothesis was that individuals who watched educational videos with family would have a more significant HgbA1c decrease than participants who watched the educational videos alone. The Diabetes Self-Management Questionnaire (DSMQ) was utilized to measure the understanding of diabetes and self-care modalities by the study participants at baseline, one month after education. After the education intervention, the patient's fasting glucose level is also drawn and evaluated at one month. Only three people returned the DSMQ data. Thus, the information on diabetes understanding could not be interpreted. However, the glycated hemoglobin (HgbA1c) was drawn 3 months after the baseline level, showing an overall decrease in fasting glucose and HgbA1c levels. However, there was no statistically significant difference between members who watched the videos alone and those who watched the videos with a family member. Therefore, the null hypothesis could not be accepted with the data collected.

Keywords: Type 2 diabetes, HgbA1c, family-inclusion diabetes education

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Chapter 1: Introduction

Every day, millions of Americans are affected by type 2 diabetes (T2D), whose causes include family history, insulin resistance, aging, obesity, and lack of physical activity. In 2014, 29.1 million people in the United States and more than 400 million worldwide were affected by T2D (Santos-Longhurst, 2014). In T2D, as glucose levels rise and remain elevated, the pancreas produces more insulin to transport glucose into the cells; cells absorb their maximum amount of glucose, but an elevated level remains. As a result, the pancreas continues to produce insulin, but the cells cannot accommodate more glucose, resulting in a state of insulin resistance. Lifestyle changes such as weight loss, physical activity, and healthy eating habits are methods used to control rising blood sugar. However, insulin resistance often occurs with other metabolic symptoms and complications. T2D is preventable; however, more people have been diagnosed annually due to the increased prevalence of obesity and the population aging in the United States (NIH, 2013).

The growing prevalence of T2D within the United States has caused a significant rise in healthcare costs. The total cost of diabetes in 2017 was $327 billion, which included $237 billion in direct medical care and $90 billion in lost productivity (Yang, 2018). Direct medical care included costs associated with T2D testing and medications. Lost productivity often arises from complications of uncontrolled blood glucose levels, which include heart disease, stroke, retinal eye disease, peripheral vascular disease, and nerve and kidney damage, which cause significant tissue destruction (Papatheodorou et al., 2018).

The morbidity and mortality of patients with T2D increase with age. Hospitalizations have increased over the years as a result of the aging population of the United States. As patients' needs change through the evolution of T2D and life transitions, providers must adjust

and modify Diabetes Self-Management Education and Support (DSMES). To improve patients' ability to receive DSMES, as a healthcare community, providers need to increase awareness of the programs, improve access, and address barriers such as reimbursement policies (Akirov, 2020).

Problem Statement

Education is essential in managing T2D but is often lacking in primary care clinics because primary care providers (PCP) have limited time to spend with each patient. The lack of diabetes education negatively impacts the adequate evaluation and treatment of each individual and the ability to provide effective T2D control. In addition, a dedicated T2D coaching team can affect educational standards with increased disease management. The lack of patient education is the most crucial determinant of uncontrolled T2D (Abazari et al., 2012).

T2D negatively affects patients and families physically, emotionally, mentally, and spiritually. T2D is a disease that affects overall eating habits (increased or decreased appetite), frequency of physical activity, and stress levels due to frequent blood glucose testing. In addition, T2D is a disease that changes the patient's life and affects the lives of family and friends. Therefore, diabetic patients' outcomes can affect how well their family members cope with the disease.

Family members can help the patient manage T2D as a part of a routine of diet and glycemic control instead of T2D care controlling their entire life. With increased control over glucose levels and decreased physical and emotional stress with family support, the patient with T2D can have a better quality of life. In addition, improved glycemic control can reduce morbidity and mortality in adults with T2D. Felix et al. (2020) noted that diabetes self-management education (DSME) curricula improve outcomes when families are involved.

Purpose Statement

This study was designed to describe the best education practices in outpatient clinics to treat T2D and provide appropriate family-inclusion teaching to assist patients in controlling their disease. Family-inclusion diabetes education is the practice of giving patients and their family supporters the knowledge needed to manage glucose levels. A patient can feel overwhelmed by dietary changes, checking glucose levels multiple times daily, medication adherence, and maintaining physical exercise and weight loss. Denham et al. (2011) noted that improving educational programs that stress family engagement could strengthen personal diabetes self-management outcomes.

Significance

Diabetes education is significant in improving patient outcomes by enhancing glycemic control. DSMES is designed to improve informed decision-making, self-care behaviors, problem-solving, collaboration within the healthcare team, clinical patient outcomes, health status, and, most importantly, quality of life (Funnell et al., 2010). Chrvala et al. (2016) noted that DSMES is a diversified tool that can evaluate physical and behavioral changes and measure T2D outcomes. Improved knowledge of diabetes increases self-care activities such as following a diet prescribed for diabetics, monitoring glucose, and regular exercise. Patients who participate in DSMES identify fewer barriers to glucose monitoring, medication adherence, and overall activities that improve glycemic control (Fenwick, 2013). Formal T2D education focuses on education directed to the patient without including family members.

Primary care clinics that utilize a patient-centered approach and built-in systematic methods, such as provider reminders for risk assessments and a checklist for recommended diabetes interventions, have improved diabetic care outcomes (Peterson et al., 2019). In addition,

patient-centered approaches in the clinic contain family-inclusion education to improve T2D management outcomes. Family members and friends play a vital, supportive role in the successful self-management of diabetes (The Lancet Diabetes & Endocrinology, 2018). Supplying family members with the knowledge to support the diabetic patient in improved eating habits, increased physical activity, better medication adherence, and maintaining timely appointments with PCP will result in better clinical outcomes.

Although the education received benefits the patient, the family members benefit too. Family-inclusion diabetes education can also contribute to decreased number of future T2D diagnoses within the family, if the family members and friends make lifestyle changes. Family members learn vital information to decrease their risk of prediabetes and T2D. According to McElfish et al. (2019), "Family-DSME explicitly addresses diabetes self-management within a family context by using family motivational interviewing and goal setting, providing education on supportive and nonsuppurative behaviors in the family environment, and focusing on family behavioral changes" (p. 59). Fenwick (2013) noted that insufficient knowledge about diabetic goals and self-care strategies is a significant barrier to diabetic control. Bennich et al. (2017) noted that when patients and their families interact in a supportive process that includes meal planning, medication and appointment reminders, and exercise, T2D self-management and sustaining behavioral changes are improved. Multiple studies suggest improvement in T2D outcomes occurs when family support and encouragement are provided.

Research within family-inclusion diabetes education is lacking. With limited research, a lack of knowledge exists concerning effects, cost, and diversity. More research is needed to evaluate the effectiveness of family-inclusion diabetes education on adult patients in diverse communities. In addition, with the absence of research comparing the efficacy of family

inclusion to traditional education, the widespread practice of family-inclusion diabetes education does not exist (McElfish et al., 2019).

Nature of Project

The project evaluated the importance of family-inclusion diabetes education in controlling glucose levels in patients in outpatient clinics. Existing adult patients were identified as having T2D, with a glycated hemoglobin (HgbA1c; i.e., blood test that shows average patient glucose levels for the last 3 months) level greater than 7.0%, without prior family-inclusion diabetes education. PCP was contacted and given the Diabetes Self-Management Questionnaire (DSMQ; see Appendix A). These tools evaluated physical, psychological, and social factors. The patients were then recommended for the project by PCP in outpatient clinics. First, 39 control patients were chosen with baseline HgbA1c $\geq$ 7.0% and DSMQ pretest with no history of formal diabetes education. Of those, 19 experimental patients were selected to participate in family-inclusion education. Pre-intervention DSMQ questionnaires were completed. Video-based instruction, including the interested family members (especially caretakers, such as spouses and children), were given in six 30-minute sessions over 3 weeks. The education included information about the disease process, treatments, risks, complications, preventive measures, laboratory testing, diet, exercise, and weight management. After the learning sessions, the clinical nurse gave the patient and family educational packets. I obtained fasting glucose levels and DSMQ scores before education and one month after the family-inclusion diabetes education. I analyzed the study patients' degree of glycemic control.

Research Question

The research question in this project was: In adult patients over 40 years old, with type 2 diabetes and a HgbA1c > 7% in an outpatient clinic, how effective is family-inclusion diabetes

education compared to a patient only diabetes education in decreasing fasting glucose levels one month after teaching? The research question evaluated in this project included patients ≥ 40 years old with a diagnosis of T2D. The participants were also narrowed by having HgbA1c > 7.0% in an outpatient clinic. The project evaluated how effective family-inclusion diabetes education was compared to patient-only diabetes education in decreasing HgbA1c levels one month after teaching intervention.

Hypothesis

The project included 39 participants, divided into 27 female and 12 male volunteers. Of these, 20 individuals watched videos alone, and 19 participants watched videos with a chosen family member. Lab values were acquired before and after the participants watched the six educational videos. The capstone project was designed to determine if family-inclusion diabetes education significantly decreases fasting glucose and HgbA1c levels, as compared to patient-acquired education alone.

Conceptual Framework

This study utilized a combination of the behavior change theory framework and the health belief model (HBM) as its conceptual framework. According to Rigby et al., (2020), "Behavior change theory frameworks provide the theoretical underpinning for effective health care" (p. 1172). For example, Irwin Rosenstock developed the health belief model (HBM) in 1990 (see Figure 1). Anderson et al. (2005) noted that the HBM concentrates on the patient's understanding of their disease, its complications, and the efficacy of disease management. Diabetic educational programs developed through the lens of HBM concentrate on the severity of diabetes and diabetic complications (Anderson et al., 2005). Carpenter (2010) found that the

model shows that patients with positive beliefs about their disorder seek information and tend to handle their illness better.

The HBM is a model developed to determine individual health beliefs. Utilizing the health belief model simplifies the outcome management of research studies concerning T2D. By identifying perceived vulnerability and severity to diabetes, interventions are developed improving disease management.

Chapter Summary

In conclusion, outpatient education in patients with T2D is crucial for disease management and glycemic control. The recommendation exists for T2D patients to receive DSME to develop coping strategies that promote glycemic control (Sayeed et al., 2020). The DSMQ (Diabetes Self-Management Questionnaire) is valid and reliable when evaluating diabetes education understanding in individuals with T2D (see Appendix B). The DSMQ assesses diabetes self-care behaviors related to metabolic control commonly part of treatment (Schmitt et al., 2013). Utilizing the DSMQ for data where evaluation and fasting glucose levels will show an overall picture of the diabetic patient's disease management. With this increased knowledge and compliance, healthcare costs will be decreased due to the prevention of complications. Additionally, a reduction in visits to the emergency room and admission rates would also improve healthcare costs.

Chapter 2: Literature Review

The purpose of this chapter is to provide a literature review that will govern the research project to answer the PICOT question: In adult patients over 40 years old with type 2 diabetes and a HgbA1c > 7% in an outpatient clinic, how effective is family-inclusion diabetes education compared to a patient only diabetes education in decreasing fasting glucose levels one month after teaching?

Literature Search Methods

A literature review was performed through the DNP Library Database at Abilene Christian University to examine the importance of social and family support in managing T2D. The subsequent vital terms are used in the search plan: diabetes education in the abstract, family in the abstract, and type 2 diabetes, for 6508 articles. The articles were limited to full-text, scholarly (peer-reviewed) journals and academic journals. The articles in the literature review were limited to the years 2016–2021. The reports were limited to English, with a total of 1185 articles. The reports were then limited to the subject of patient education. The review contained studies conducted in Asia, Denmark, India, the Republic of the Marshall Islands, and the United States. With the limiters utilized, a total of 33 articles were discovered. Articles that contained gestational diabetes and type 1 diabetes were eliminated. Within the 33 articles, six were chosen to critique the evaluation and importance of family, including education on T2D management. These articles were chosen based on keywords including *DSME*, *T2D*, *patient education*, and *family support*. Articles with a foreign language in the abstract, group education, technology-based education, and inpatient education were eliminated.

De La Fuente Coria et al. (2020) and Helms Andersen and Grabowski (2020) evaluated the importance of family support and education in self-management care for T2D patients. De La

Fuente Coria et al. (2020) conducted a randomized controlled clinical trial in Spain with a nurse-led individualized education program and family support to achieve metabolic goals. The educational intervention included six face-to-face meetings for 30 minutes each over 6 months, with tracking at 12 and 24 months. After 12 months, the intervention group participants improved HgbA1c levels and systolic blood pressure. After 24 months, achieving the goal of HgbA1c <7% occurred more in the intervention group (De La Fuente Coria et al., 2020). Thus, T2D education with family support can delay the progression of T2D and improve disease management. Helms Andersen and Grabowski (2020) also incorporated family involvement in the education of T2D patients in Denmark. In Denmark, DSME often has weekly meetings for 6 to 10 weeks with various allied healthcare professionals for lifestyle changes and social support. The Family Toolbox, containing four instruments, was developed to support family members' involvement in patient education. The four components of The Family Toolbox are: (a) The Family Mirror, utilized for introspection and to improve communication; (b) The Family Book focuses on knowledge that focuses on family life with T2D; (c) The Family Line, which helps patients reflect on how much T2D plays in their life and how much it should play; and (d) The Family Plan designed for families to identify shared challenges and to make a clear plan on how to act. The study utilized interviews with 13 healthcare professionals that implemented The Family Toolbox. The study found that implementing family involvement is possible but simultaneously dependent on the commitment of the healthcare professional (Helms Andersen & Grabowski, 2020).

Pamungkas et al. (2017) conducted a systematic review of 23 articles to evaluate DSME, including family support and self-management. DSME involving family support on diabetes outcomes through patient disease management was evaluated. Through educational classes,

group discussions, and follow-up modalities, goals were set with participants, and disease management was measured. DSME was found to affect health outcomes in T2D patients significantly. In addition, family involvement and support can help patients strengthen self-management interventions (Pamungkas et al., 2017). Maslakpak et al. (2017) evaluated the effectiveness of telephonic versus face-to-face family-oriented education on self-care behavior and patient outcomes in T2D in Iran. The study found that face-to-face education had significantly improved scores. Better dietary adherence was found for the face-to-face group than for the telephone-based group. In addition, lipid levels and foot care were improved in the intervention groups compared to the control group (Maslakpak et al., 2017). Through face-to-face educational classes and patient follow-up, there was a significant improvement in diabetes outcomes.

Felix et al. (2019), Patodiya et al. (2017), and Powers (2017) used DSME in T2D patients to evaluate outcomes through family support to measure diabetes management. Powers (2017) evaluated the importance of diabetes education compared to standard T2D treatments. By placing the T2D patient at the center of care and allowing them to participate in their care plan, diabetes management improved. DSME was compared to metformin (a standard medication in the treatment of T2D). Both modalities showed high efficacy, low hypoglycemic risk, and neutral/weight loss. Furthermore, DSME had no side effects but cost savings and high psychosocial benefits. Researchers compared a family DSME intervention's effectiveness to standard DSME intervention in a randomized control trial. The family inclusion education precipitated a more significant reduction in HgbA1c levels 12 months postintervention. In addition, daily glucose testing and the percentage of patients reporting an annual check-up improved significantly from baseline to the 12-month postintervention observation (Felix et al.,

2019). In India, Patodiya et al. (2017) significantly affected the patients' knowledge regarding T2D and showed that family care education is effective among T2D patients.

Limitations

More research is needed to strengthen data, including the degree of instructors' abilities, ongoing training, production and availability of teaching materials, and continuous assessment of diabetes T2D education programs. Further studies are suggested to substantiate the efficacy and feasibility of such family-oriented education interventions on other T2D patients' outcomes. Future studies should focus on more systematic data collection and tactics to overcome potential self-reporting bias.

Conclusion

T2D is a disease that has become more prevalent in recent decades. Predisposing factors include obesity, lack of physical activity, and family history. Diabetic complications can occur when glucose levels remain uncontrolled, including neuropathy, cardiovascular disease, nephropathy, and retinopathy. Family inclusion diabetes education has been shown to improve T2D health outcomes and decrease potential complications (Felix et al., 2019; Helms Andersen & Grabowski, 2020; Maslakpak et al., 2017; Pamungkas et al., 2017; Patodiya et al., 2017). Advantages of family-inclusion diabetes education include increased patient support and reinforcement of healthier meals and exercise, resulting in improved glucose levels, self-care behaviors, and HgbA1c levels. However, some studies identified a small sample size as a limitation (Helms Andersen & Grabowski, 2020; Maslakpak et al., 2017). In addition, the sample size is often affected by exclusion criteria, lack of interest, or follow-through by patients for the entire study.

Further studies are recommended with increased sample size, more frequent follow-up, and evaluation education interventions with and without family involvement (Felix et al., 2019; Helms Andersen & Grabowski, 2020; Maslakpak et al., 2017; Pamungkas et al., 2017). Education about T2D prevention and disease management can be the key to delaying or preventing T2D diagnosis; therefore, assessing the type of education that works best for most T2D patients is crucial.

Chapter Summary

Over 300 million people have been diagnosed with T2D in the U.S. and internationally. The documented cost of healthcare due to T2D complications has increased exponentially. T2D education can be the key to improving disease management and decreasing complications and healthcare costs. The benefits of diabetes education are widely documented (De La Fuente Coria et al., 2020; Felix et al., 2019; Helms Andersen & Grabowski, 2020; Maslakpak et al., 2017; Pamungkas et al., 2017; Patodiya et al., 2017). The DSME tool was utilized in numerous studies (Helms Andersen & Grabowski, 2020; Pamungkas et al., 2017) and effectively decreased healthcare costs with improved disease management and reduced complications. DSME has been found "to increase or improve quality of life, self-efficacy, empowerment, healthy coping, knowledge, self-care behaviors, adherence to a food plan, healthier food choices, increased physical activity, and use of glucose monitoring data" (Powers, 2017). The inclusion of family members in educational programs for diabetes patients does not often occur. However, including family in diabetes education can significantly improve diabetes health outcomes.

Chapter 3: Research Methods

This research aimed to evaluate the effect of patient-only diabetes education versus patient and family (family-inclusion) diabetes education. The hypothesis was that family inclusion diabetes education would increase patient learning and decrease fasting glucose levels after 3 weeks of intervention, more than with patient-only diabetes education. In addition, providing diabetes education to patients and their immediate families would improve diabetes outcomes, measured by fasting glucose levels and DSMQ scores from baseline to one month after the intervention.

IRB Protocol Title

The project title was family-inclusion diabetes education and developing an effective standard education program for diabetes patients in the clinic setting. The project was presented to the internal review board (IRB) comparing diabetes education modalities. Standard diabetes teaching has included patient-centered educational programs. Standard programs were compared to family-inclusion diabetes teaching through lab value changes including HgbA1c and fasting glucose levels.

Project Design

This project utilized a quantitative, comparative case study design to investigate the effectiveness of patient-only diabetes education versus family-inclusion diabetes education. A qualitative, close case study design was appropriate for this project because this design considers the patient values for glucose and HgbA1c and questionnaire scores for diabetes education understanding when utilizing fasting glucose levels.

Instrument/Measurement Tools

There are two specific measurement tools for diabetes education. The first is the Summary of Diabetes Self-Care Activities Measure (SDSCA), the most popular data questionnaire used to evaluate diabetes learning. However, the SDSCA was not originally conceived to correlate with HgbA1C levels (Schmitt et al., 2013). The other measurement tool is DSMQ. Schmitt et al. (2013) developed the DSMQ (see Appendix I) to assess self-care behaviors related to the measure of HbgA1c. By utilizing the fasting glucose levels and HgbA1c levels in this study, the DSMQ is more appropriate for this study.

Data Collection & Analysis Plan

Although the samples were linked to the patient's chart for diabetes management through the outpatient clinic; no patient identifiers were used for study purposes. Any protected health information (PHI) related to the patient was locked in a secure safe. The computer and laptops containing patient data were encrypted. A web application was utilized to ensure data are protected. The PHI (names, contact information, and other identifiers of the subjects) were collected and stored on an encrypted computer database. The database remained secure, and the information was placed in a locked safe after data analysis and completion of the project. I ensured informed consent was obtained from each subject (see Appendix F).

The suitable size for this study was a minimum of 39 individuals, 20 participants in the survey with family-inclusion diabetes and 19 participants in the control group (participants that receive no formal diabetes education). The goal was to have 39 participants divided into two groups if the referral base is large enough.

The dates were Spring and Summer of 2022. The subjects were recruited in a nonpredetermined mix of men and women who the practitioners identified at the study site as

meeting the criteria of baseline HgbA1c level > 7%. In addition, retrospective fasting glucose and HgbA1c levels were utilized, along with diabetes education provided to patients and their families, evaluation of fasting glucose levels, and DSMQ scores one month after the intervention.

Methodology

The outpatient family practice clinic does not provide adequate diabetes education. Often patients are diagnosed with diabetes and given basic instructions in the clinic in the same visit. For example, the patient is shown how to use a glucometer, given handouts on diabetes education, told when to collect their glucose levels, instructed on how to take their medication, and told to follow up in a few weeks with the practitioner.

If diabetes education occurs, the patient is often sent to a diabetic educator or educated in the office about the disease process. This study identified patients as diabetic with a baseline HgbA1c level > 7%. I provided the patient and their immediate family (spouse, child, parent) diabetes education. The goal was to educate the patient and family on the disease process, leading to decreased fasting glucose levels and a better understanding of diet and disease management. In addition, involving the family (i.e., especially the members that shop for groceries and cook) should lead to better compliance and improved diabetic outcomes.

Feasibility

The study was conducted by the primary care office's nurse identifying 39 T2D patients aged 40 years and older, with a baseline HgbA1c of ≥ 7.0% (see Appendix C). The clinic nurse will contact these individuals to see if they would be interested in participating in the study. When the patients were identified by the nurse, more detailed information was provided to the participants. A baseline HgbA1c, DSMQ score, and fasting glucose will be obtained, followed

by 3 weeks of educational diabetes videos. The clinical nurse and I retested DSMQ and fasting glucose one month after the educational intervention. Tests were administered to the individuals before and after the educational intervention. The timeline of this study was managed through the Doctor of Nursing Practice (DNP) program at Abilene Christian University (ACU; see Appendix G).

Appropriateness

Schmitt et al. (2013) found that using the DSMQ, diabetes self-management considerably correlated to glycemic control by measuring HgbA1c levels. The evaluation of 39 adults with T2D aged 40 years and older gave a good sample size of individuals for the study. The DSMQ is a valid and reliable tool for evaluating diabetes self-care activities from the patient's point of view. The test results, along with fasting glucose levels, show the level of glycemic control of the patient.

IRB Process

IRB training was completed, and the project proposal defense was passed before the proposal application was submitted for this study. First, a site approval letter was received from the clinic's owner where the study would be conducted. A patient solicitation form, provider instructions, and a solicitation flyer were created to provide specific information for the clinic staff and study participants (see Appendix D). Patient data were used for the study, so a HIPAA form, exempt research request, and consent form were utilized. Permission was obtained to utilize the DSMQ for self-management data collection. These letters and forms, along with a signature and assurance form, were submitted to the IRB for approval of the study. Edits were made and resubmitted, and permission was granted for data collection (see Appendix E). Therefore, no data were obtained before the IRB proposal was approved.

Interprofessional Collaboration

Interprofessional collaboration occurred between the sponsors of this research project and me as the researcher. They allowed access to their patient data and population to obtain consent. The information was collected for the most recent HgbA1c and fasting glucose levels. In addition, the patients were given pre-/posttest DSMQ surveys, access to educational videos, and data were DSMQ surveys. These collaborators also reviewed the information and assisted with project development. Thus, I have collaborated with the project chair and committee members:

- Sheryl L. Wright, MSN, FNP-C
- Rita Hollingsworth, DNP, FNP-C
- Heather McFarland, MSN, FNP-C

Rita Hollingsworth, DNP, FNP-C, served as a mentor throughout the DNP program. Ms. Hollingsworth received her Bachelor of Science in Nursing (BSN) from the University of Tennessee at Martin in Martin, Tennessee, in 2004. She obtained her Master of Science in Nursing (MSN) at the University of South Alabama in May 2015. She earned her Doctor of Nursing Practice (DNP) at the University of South Alabama in August 2015. Ms. Hollingsworth has worked as an Emergency Room Nurse Practitioner for several years and now is the lone care provider in a rural health clinic in West Tennessee.

Heather McFarland, MSN, FNP-C, received her Bachelor of Science in Nursing (BSN) from Union University in Jackson, Tennessee, in 1996. She worked at Jackson-Madison County General Hospital in Jackson, Tennessee, from 1996 – 1997. Ms. McFarland obtained her Master of Science in Nursing (MSN) from the University of Tennessee Health Science Center (UTHSC) in Memphis, Tennessee, in 1998 and passed her nurse practitioner certification. She worked at a

rural outpatient clinic in Alamo, Tennessee, from May 1998 – October 2009. Ms. McFarland became an entrepreneur and opened multiple clinics in West Tennessee.

Project Setting

The project setting was multiple nurse practitioner-owned family medical clinics in Tennessee. The clinics were in rural West Tennessee and employed family nurse practitioners full-time and part-time. The facilities provide acute and primary care to males and females of all ages.

Target Population/Sample

The target sample size is 39 individuals aged 40 years and older seen in outpatient clinics for T2D with a baseline HgbA1c > 7% at the clinic. The clinics were chosen due to their location and staffing. The clinics were located within an 80-mile distance, and the owners have over 35 years of experience in family practice. The clinic staff are familiar with diagnosing and treating diabetes, treating patients of all ages, and having the resources to draw blood for disease management.

Risks

The clinic nurse and I retrospectively retrieved HgbA1c and fasting glucose levels from the database. Then, HgbA1c and fasting glucose levels were drawn at the clinic one month after the diabetes education. There was a risk of infection with any wound opening of the skin. Therefore, there was minimal risk of patients losing confidentiality. However, during data analysis, all identifiers and PHI were removed by me from the encrypted computer database.

Potential Benefits

The individuals have a greater understanding of diabetes, diet, exercise, and disease management. As a result, the patient and their family benefited from improved T2D disease

management to increase the quality of life and decrease T2D complications. In addition, a family that learns, cooks, eats, and exercises together can develop healthy eating habits and improve their overall healthy lifestyle.

Timeline

Baseline HgbA1c levels and fasting glucose levels will be obtained from the patient or retrospectively from the clinic records of the collaborative providers. The DSMQ pretest will be administered to the study participants. The intervention will include bi-weekly diabetes education sessions with videos for 3 weeks. With access to the videos, the patients and their families can review them at their convenience. One month after the intervention of educational videos, fasting glucose levels will be reevaluated by me with the administration of a DSMQ.

The video sessions were as follows:

- **Video 1: Diabetes Mellitus Overview.** An overview of diabetes is presented, including family history, disease process, and disease management. Diabetes data are presented and reviewed. Information such as the importance of lab work and follow-ups every three months, issues to look out for, diabetes complications and how to prevent them will be discussed.
- **Video 2: Diet.** An overview of diet information is provided. Carbohydrates and hidden sugars are presented. The importance of a balanced diet and having snacks on hand are given to prevent hypoglycemia. Foods to avoid or limit are discussed, as well as healthy foods.
- **Video 3: Recipes.** The importance of a balanced diet is reiterated. Various recipes are presented for a healthy diet. Substitutions are identified to use in recipes to decrease fats and carbohydrates. Recipe resources for diabetes patients are also discussed.

- **Video 4: Exercise.** This video discussed physical activity, low-impact exercises, and how to develop a walking plan alone and with family. Physical activity applications were recommended, and local churches with exercise classes, local walking tracks, and YMCA programs were identified by me. Participants were encouraged to discuss exercise programs with their providers before engaging in them.
- **Video 5: Complications. M**edications and side effects are discussed. Signs and symptoms of diabetes are presented, including polyuria, nocturia, numbness, and tingling in limbs. In addition, complications such as erectile dysfunction, kidney disease, vision, and heart disease are reviewed.
- **Video 6: Summary. A** summary of the information covered in the previous videos is mentioned. This video is about getting to the practical details, asking provider questions, reviewing logs, and raising diet awareness. Finally, the following steps to be successful in diabetes management are addressed.

Chapter Summary

In conclusion, the need for outpatient education in patients with T2D is crucial for disease management and glycemic control. To improve self-worth and self-awareness and develop T2D coping skills, the recommendation exists to offer diabetes self-management education (Sayeed et al., 2020). The DSMQ is valid and reliable when evaluating diabetes education understanding in individuals with T2D. Utilizing the DSMQ for data evaluation and fasting glucose levels showed an overall picture of the diabetic patient's disease management and educational understanding.

Chapter 4: Results

This quantitative study was performed in a group of primary care clinics in rural West Tennessee. A clinic nurse identified the participants within three medical clinics. With the comparison of fasting glucose and HgbA1c levels, quantitative data were appropriate for implementing DSMQ surveys. The intervention included six educational videos containing information on diabetes. The comparison was between patients watching the videos alone and patients watching the videos with a family member. The lab values were then compared from their last fasting glucose and HgbA1c data from the medical clinic to data 3 months after their previous labs and 1 month after the intervention. I hypothesized that providing diabetes education to the patient and their family member would improve fasting glucose and HgbA1c levels more than in patients who watched the videos alone. Unfortunately, not all patients had a decrease in HgbA1c and fasting glucose levels. However, the results showed that all participants' overall average HgbA1c and fasting glucose levels decreased.

Purpose of the Project

This project was designed to compare pre-/posttest answers with lab values, including fasting glucose and HgbA1c levels. The HgbA1c was intended to evaluate glycemic control for the 3 months before testing. The goal for glycemic control is HgbA1c <7.0%. The quantitative study utilized this data to compare the effectiveness of patient-only diabetes education versus family-inclusion diabetes education. DSMQ questionnaires were given to patients to complete before and after watching educational videos. All pretests were returned, but only three posttests were returned. Thus, the data from the posttests were not significant for data analysis.

Due to COVID-19 restrictions, the risk of transmission, and the increased risk of T2D patients having complications, in-person education sessions were reevaluated. Thus, online

videos were provided to the participants for educational purposes. The participants viewed six diabetes education videos, including information on diabetes mellitus overview, diet, recipes, exercise, complications, and summary. The study hypothesized that a statistically significant difference would be seen in patients who watched videos with their family members as opposed to patients who received diabetes education alone.

The statistical data met the criteria for the two-tailed *t*-test. The requirements included continuous, two independent, and two dependent variables with a normal distribution (Hayes, 2022). Thus, this analysis allows for testing for statistical significance. Statistical differences were evaluated by me between participants of the study based on watching the videos alone versus the participants who watched the videos with family members. Additional statistical differences were quantified between male and female participants. The p-value notes statistical significance. A p-value less than 0.05 is statistically significant, but a p-value greater than 0.05 is not statistically significant. Probability indicates the possibility that an event will occur. The participants were slow to return completed DSMQ questionnaires. There were 39 DSMQ questionnaires sent out, with a total of 35 pretest DSMQ questionnaires and three posttest DSMQ questionnaires returned. These questionnaires evaluated information for changes in diabetes education and self-management methods. However, I could not achieve statistically significant analysis results with the posttest data with the low number of questionnaires returned.

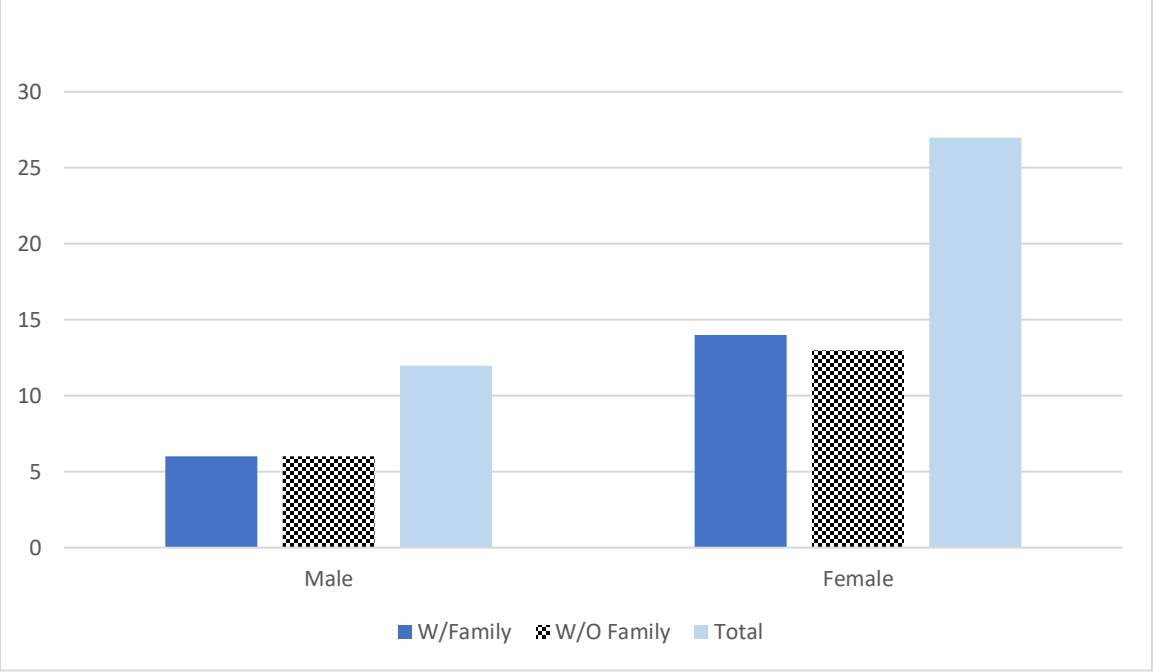
Demographics

The targeted participants in the study were individuals with T2D, over the age of 40, with a HgbA1c > 7%. Normal, below 7.0%, HgbA1c levels indicate reasonable glycemic control, leading to better outcomes for diabetic patients and fewer complications. Thus, ≥ 7.0% shows poor glycemic control, leading to poor results and an increased risk of complications. There were

82 patients with T2D identified. However, only 39 of those individuals met the age 40 or older guidelines with a HgbA1c level > 7.0%. Individuals that volunteered to participate in the study but were excluded included 43 people. Out of these individuals, 22 were younger than 40 years of age, 15 had HgbA1c levels ≤6.9%, and six volunteers were diagnosed with type I diabetes. These patients were seen at a group of primary care clinics in West Tennessee. Therefore, the final sample size was sufficient for the study. In addition, the sample met the sample size requirement of a minimum of 30 patients. A total of 27 female and 12 male patients made up the participants. Of the females, 20 watched the videos with a family member, and 19 watched the videos alone. Six males watched the videos with a family member and six alone (see Figure 1).

Figure 1

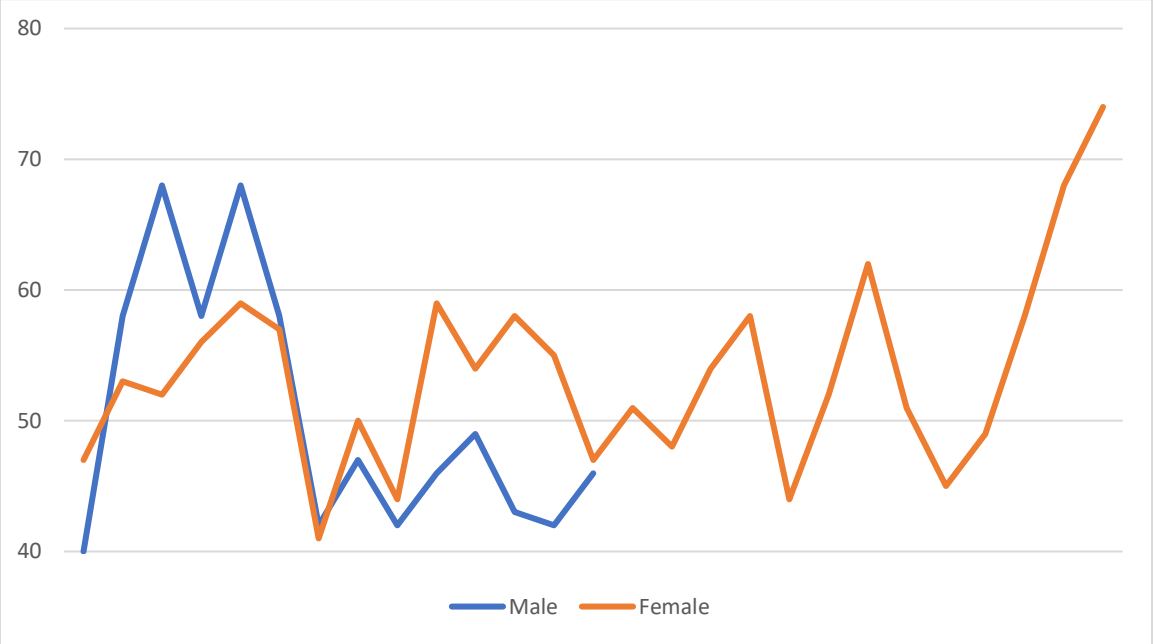
Distribution by Gender of Participants Watching Videos With and Without Family



The participants were 69% female and 31% male. The age range for the participants was 40-74 years old. The mean age of the participants was 51.9 years, with a female average of 53.5 years old and a male average of 48.4 years old (see Figure 2).

Figure 2

Line Graph of Male and Female Age Ranges

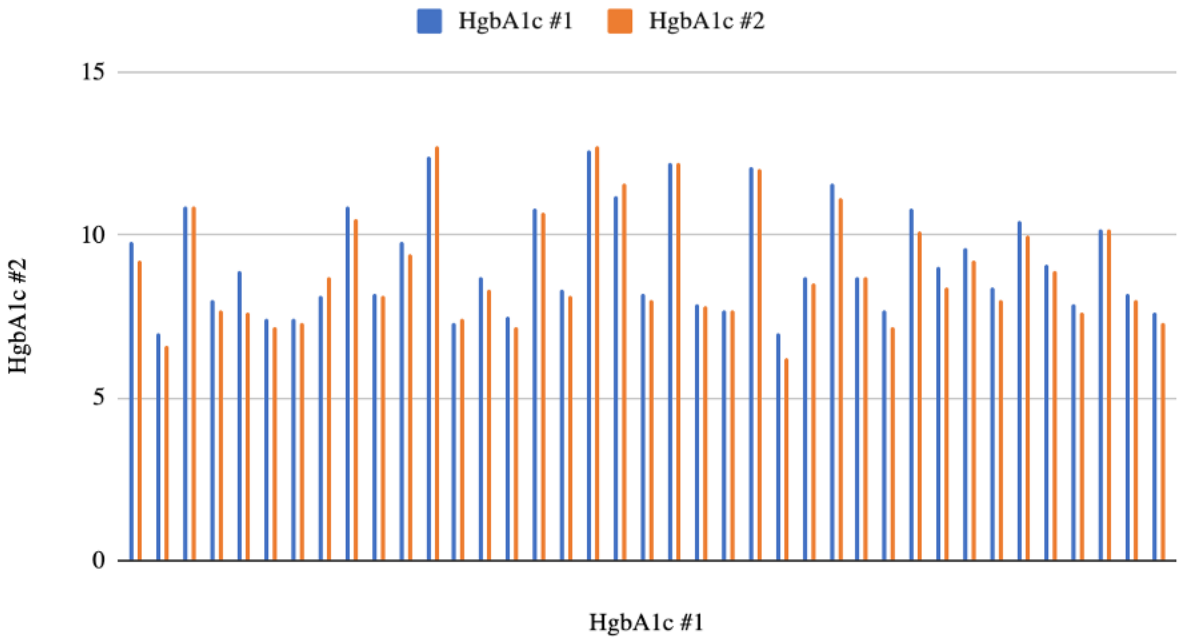


Data Analysis

Quantitative data analysis was performed on the information collected during the study. First, the clinic nurse obtained initial HgbA1c and fasting glucose levels from the patient records. I then provided the participants with a DSMQ questionnaire for pretest data. After the questionnaires were returned, the six education videos were forwarded by me to the participants. After watching the videos, the participants completed the DSMQ posttest questionnaire. Next, the clinic nurse collected the fasting glucose and HgbA1c levels 3 months after their previous HgbA1c level. Finally, I compared the second fasting glucose and HgbA1c to the first lab levels (see Figure 3).

Figure 3

HgbA1c #1 and HgbA1c #2 (All Participants)



Changes in the HgbA1c levels and fasting glucose levels were compared dependent on watching educational videos alone or watching videos with a family member. The variations were then compared to the participant sex group. After evaluating the change in fasting glucose and HgbA1c levels, a mean score was calculated. A two-tailed t-test was used to analyze the data. The analysis compared the posteducation lab results of patients who watched videos and the data of individuals who watched videos with family members. The male and female mean HgbA1c is included in Table 1.

Table 1

Pre-/Postintervention Male and Female Mean Hgba1c

Education	Total male mean HgbA1c	Total female mean HgbA1c
Pre-	8.5%	9.0%
Post-	8.2%	8.9%

Statistical data were calculated using input data through Microsoft Excel. The information compared HgbA1c levels before and after the intervention. A paired *t* test was performed to calculate the overall changes in pre- and posteducation intervention. The pre-intervention mean was calculated at HgbA1c of 9.185%, with an *SD* of 1.656 and a *SE* difference of 0.265. The postintervention mean was calculated at HgbA1c of 8.949%, with an *SD* of 1.752 and an *SE* difference of 0.281. This data are presented in Table 2.

Table 2

Pre-/Postintervention Sample t *Test HgbA1c Levels*

Education	*M*	*n*	*SD*	*SEM*
Pre-	9.185%	39	1.656	0.265
Post-	8.949%	39	1.752	0.281

With this data, the decrease in the levels of data was found to be highly insignificant, with a two-tailed p-value less than 0.0001. The mean of the pre- minus post- equals 0.236. This difference has a 95% confidence interval from 0.127 to 0.345. Other values include *t* of 4.3949, *df* of 38, and *SE* of the difference of 0.054. The pre- and postintervention fasting glucose levels showed an overall decrease. The average preeducation fasting blood glucose levels were 209.31

mg/dl, with the mean posteducation fasting blood glucose levels running 189.41 mg/dl. These values show a decrease in fasting blood glucose levels of 19.9 mg/dl.

Question Guiding the Inquiry

The PICOT question was: In adult patients over 40 years old with type 2 diabetes and a HgbA1c > 7% in an outpatient clinic, how effective is family-inclusion diabetes education compared to a patient only diabetes education in decreasing fasting glucose levels one month after teaching? The findings showed no meaningful change in fasting glucose levels and HgbA1c levels between participants who watched videos alone and those who watched with family members. Thus, the results were not statistically significant to accept the null hypothesis.

Reliability and Validity

The Diabetes Self-Management Questionnaire (DSMQ) was developed at the Research Institute of the Diabetes Academy Mergentheim in Germany (Schmitt et al., 2013). The questionnaire has been widely used to examine the self-care behaviors in patients with diabetes to evaluate the specific educational needs of the client. Schmitt et al. (2013) noted that this is an efficient tool that provides consistent and valid data on T2D self-care and activities associated with glycemic control. This questionnaire was utilized for the pre-/posttest data collection. The sample size was significant for the study at 39 participants. Only three questionnaires were returned so posttest data could not be assessed.

Strengths and Weaknesses

Researchers often plan carefully and create steps to prepare for a study that will provide accurate and valuable information. The instruments used must be valid and reliable. Future researchers must plan the examination timeline to allow appropriate time to complete the study. Also, a hypothesis must be created, and the data analysis evaluated to prove or disprove the

theory. However, success or failure often depends on the participants' responses when examinations have been conducted.

Strengths of the study include the validity and reliability of the DSMQ instrument. Also, the sample size is significant at 39 participants, with a minimum of 30 participants being met. The individual creating the diabetic education videos has over 20 years of experience as a family nurse practitioner working in primary care. With the videos being divided into six different sessions, participants were educated on various aspects of diabetes, with a summary video bringing all the complete information circle. The repetitive information helps the viewer retain the teachings, which is a strength. Another advantage of having videos is that the participants can pause, rewind, and rewatch the information repeatedly.

Limitations include the brief period of the study, thus gathering the last HgbA1c level and the repeat level 3 months after the first. Information for 3-month, 6-month, and 9-month follow-ups could show more significant study results. Another limitation is that the videos were present virtually due to the COVID-19 pandemic. Presenting the information this way prohibited the opportunity for participants to ask questions or clarify information. Another limitation of the study is the participants' noncompliance in returning the posttest DSMQ questionnaire; therefore, posttest data could not be assessed due to only three questionnaires being returned. Delivering the DSMQ through text messages or email with recurrent prompts should be considered in future studies.

Chapter Summary

The impact of T2D education delivery on the HgbA1c levels of patients who watched the videos alone, and those that watched the videos with family members, was evaluated in this study. The two types of education deliveries were compared for the impact on fasting glucose

and HgbA1c levels. The average HgbA1c level before education was 9.1%, with the mean HgbA1c level after education at 8.9%. The data showed the overall reduction of HgbA1c levels of the participants was 0.2%, a slight decrease; however, the individuals watching the videos benefitted from the education presented. The percentage difference of participants that watched the videos alone was 2.8%, and the percentage difference of participants that watched the videos with a family member was 2.7%. With this information, the null hypothesis cannot be rejected. Chapter 5 includes a discussion of the findings, limitations of the analysis, and the Essentials of Doctoral Education for Advanced Practice Nurses. Recommendations for future research on diabetes education and indications for health care providers are discussed.

Chapter 5: Discussion, Conclusions, and Recommendations

The project compared the fasting glucose and HgbA1c levels of participants with T2D. A clinical nurse identified the participants in this project with access to the patient's lab values and ages. Individuals were chosen based on being ≥ 40 years old, diagnosed with T2D, a HgbA1c ≥ 7.0%, and not previously having standardized diabetes education. After the clinical nurse and provider chose the individuals based on inclusion and exclusion criteria, consent was obtained from the ones that wanted to engage in the project. Individuals were given DSMQ surveys to complete to measure the participant's diabetes understanding. The participants were then provided six videos to watch regarding an overview of diabetes, diet, recipes, exercise, complications, and a summary of the information provided. The videos were chosen for information on the importance of the individual elements to diabetes management. The participants were divided into two groups, one watching the videos with a family member and the other viewing the videos alone. The purpose of these two groups was to compare individuals who watched the videos alone (patient-only diabetes education) and those who watched the videos with a family member (family-inclusion diabetes education) and the relationship to changes in fasting glucose and HgbA1c levels in T2D patients. The DSMQ pre- and postvideo surveys were used to evaluate the difference in T2D understanding before and after watching informational videos. However, only three posttest DSMQ surveys were returned. Therefore, the data could not be analyzed to compare changes in understanding and self-care actions. This chapter will discuss the interpretation and inference of the data collected, limitations of the study, analysis for leaders in primary patient and diabetes care, and recommendations for future research. The American Association of Colleges of Nursing (AACN) Essentials will be

explained and explored. The project's relationship and data to the DNP Essentials will also be presented.

Interpretation and Inference of the Findings

The research in this study focused on the HgbA1c levels over 3 months with the intervention of diabetes education. Participants were given DSMQ pretests to measure their current lifestyle understanding and self-care strategies. The comparison of the fasting glucose levels and HgbA1c levels was used for the performance and compliance of the project participants. The total number of participants in the study was 39 people, including 27 women and 12 men. The participants ranged in age from 40 to 74 years old. Most participants showed a decrease in fasting glucose levels and HgbA1c levels whether they watched videos alone or with family members. The participants were given DSMQ posttests, but only three individuals returned them. Thus, the information was inadequate to show the significance of diabetes education on self-care measure adaptation. Data shows that although these overall levels decreased, there was no significant difference between participants who watched the videos alone and those with family members.

The knowledge presented through this study shows that patient education positively impacts the decrease of HgbA1c levels. With the improvement in HgbA1c levels, diabetes complications can be decreased. The lowering of HgbA1c levels shows better diabetes control with improved diabetes outcomes. The study was focused on the difference in HgbA1c improvement between participants watching videos alone and those watching videos with family members. However, there is no significant difference between participants watching educational videos alone or watching the videos with family members on the lab levels.

Limitations

There were several limitations for this project. One limitation was the small number of participants. Although the participant size was adequate for the project, the larger the number of participants, the more valuable and dependable the data could be. Another limitation was the time restraint. I reviewed the information over 3 months; however, with in-depth education and repetition, data collected over a 6- or 9-month timeline could show more decreases in HgbA1c levels. Evaluating the participant's family support, learning behaviors, and ability to implement lifestyle changes can significantly improve diabetes outcomes and future research projects.

Analysis for Leaders

Projects that look at diabetes education and its effect on patient outcomes benefit medical providers treating this disease. T2D education has been found to decrease illness complications and improve T2D outcomes. Educational programs vary significantly from face-to-face information presented during a clinic appointment, at a community center or hospital, or individualized education with a certified diabetes educator. Early intervention is key to preventing complications, improving understanding, and enhancing diabetes outcomes. Individuals need to return to their medical provider for regular intervals on a three-month basis for check-ups and lab work. The patients must also be taught signs to look for to return to the clinic between scheduled visits. Patients must understand that quarterly lab draws improve the chances of catching diabetes complications as soon as possible. Patients must make lifestyle changes, which should be commended and celebrated. Diabetes education must take precedence after the diagnosis of T2D. Individuals and family members can be included in the educational sessions to help manage diabetes, improve social support, and help prevent future generations from developing diabetes complications.

Essentials of Doctoral Education for Advanced Practice Nurses

AACN developed Essentials for Advanced Practice Nurses as a guide for education, scholarship, and excellence. AACN provides the educational basis and standards for bachelor's degree nurses through the publication of the Essentials (AACN, 2021). AACN created these essentials as guidelines for educational programs to improve nurses' preparedness. Health care today is complex, with increased diabetes and heart disease, among other conditions. Technology and medications are ever-changing, and nurses must continue educational quests to learn the necessary information to use and administer these modalities. Nursing students in colleges and universities are exposed to core competencies to become well-educated and exemplify excellence in nursing.

The AACN Essentials are devised to ensure excellence in nursing practice and leadership. Eight AACN Essentials focus on the fundamental basis of Doctor of Nursing Practice (DNP) curricula. The elements include the focus on the field of study in nursing that exemplifies the complexity of nursing scholarship. The AACN Essentials include scientific underpinnings for practice, organizational and systems leadership for quality improvement and systems thinking, and clinical scholarship and analytical methods for evidence-based practice. The application of evidence-based practice has long been a focus of nursing education. Utilizing practices that have been demonstrated and proven successful improves patient care and care outcomes. These goals not only decrease patient hospital admissions but also decrease the cost of healthcare needs. The elements also include information systems/technology and patient care technology for improving and transforming health care. The use of technology continues to grow within hospital systems and rural clinics throughout the United States. With the move to electronic health records, interprofessional collaboration, and multi-system partnerships can be incorporated to improve

patient care access. Other principles of the DNP Essentials include health care policy for advocacy in health care and interprofessional collaboration for improving patient and population health outcomes. Lastly, the principals incorporate clinical prevention and population health to improve the nation's health and advanced nursing practice. By examining each of these components, a broader concept of the fundamentals of nursing practice can be explored.

T2D is growing prevalent in the United States due to unhealthy lifestyles, the growing epidemic of obesity, and many fast-food restaurants without healthy options. As a result, millions of people are diagnosed each year with diabetes and prediabetes. Uncontrolled diabetes leads to complications and increased health care costs. There is also an increase in lost days of work and expenses for occupational and physical therapy.

Essential I: Scientific Underpinnings for Practice

According to the AACN, Essential I is the scientific underpinnings of practice. The principle of this precept is that DNP graduates acquire the knowledge needed to succeed in the nursing profession. Along with this knowledge comes the ability to interpret and apply it to positive patient care outcomes. AACN (2006) notes that nursing curricula must evolve with the changes and advancements of foundational and nursing sciences to prepare DNP for the realities of practice. For example, new advances in medications and treatment of diabetes must continue to be implemented to promote lifestyle changes, educational practices, and health care outcomes. Therefore, the DNP programs equip advanced practice nurses to incorporate health sciences, including psychology, anatomy, and sociology, as the foundation for enhanced health care delivery.

Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking

The AACN Essential II is the organizational and systems leadership for quality improvement and systems thinking. Nurses not only care for patients on a one-on-one basis but also lead community classes, educational institutions, and health care organizations. Nurses learn these leadership skills through curricula presented by DNP programs for continuing excellence in health care. In addition, nurses can provide care at the bedside as PCP, provider extenders, or diabetes educators. Essential II aims to create leaders that use innovative, sustainable approaches to promote safe, effective outcomes (Smith et al., 2018). With the progress of quality improvement, nurses entering leadership roles will continue to enhance health care.

Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

The AACN Essential III (2006) describes the clinical scholarship and analytical methods for evidence-based practice. Scholarship is the knowledge learned through educational programs and is the basis for doctoral studies. Nursing programs have long based their curricula on evidence-based practice. This information has been proven effective through successful implementation in the health care system. Nurses must continue to learn from proven modalities to enhance patient success with diabetes treatment and prevention. Through analysis, nurses also learn to use information from research to improve health care outcomes.

Essential IV: Information Systems / Technology and Patient Care Technology for the Improvement and Transformation of Health Care

AACN (2006) Essential IV is information systems/technology and patient care technology for improving and transforming health care. Technology has continued to affect health care delivery through the decades. Through medications, occupational and physical

therapy, rehabilitation programs, and community outreach, diabetes occurrence and complications can be reduced or even prevented. With technological advances, health care outcomes and a decrease in in-patient stays have improved. Although technology can be expensive to implement, the health care savings from reducing hospitalizations and infections can offset the costs. The implementation of technological advances may even save money in the long run. The application of electronic health records has been monumental in information distribution and interprofessional collaboration.

Essential V: Health Care Policy for Advocacy in Health Care

The AACN Essential V (AACN, 2006) is a health care policy for advocacy in health care. With the enactment of the Affordable Care Act (ACA) in 2010, health care costs and provider reimbursements have influenced health insurance companies and health care delivery systems. Nurses are trained in DNP programs to advocate for policies that improve health care delivery. For example, one of the essential groups today needs advocacy in patients with diabetes for more affordable medications and education to prevent complications and hospital admissions. In addition, patients of all socioeconomic levels should have health care options that are affordable and accessible. Nurses must use their positions and numbers in unison to influence healthcare policies that provide the best healthcare opportunities for their patients and communities.

Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

The AACN Essential VI (AACN, 2006) is an interprofessional collaboration for improving patient and population health outcomes. Collaboration is a fundamental necessity in the comprehensive care of patients in the health care system. Having information readily

available through interprofessional collaboration can decrease morbidity and mortality in the United States. By sharing information through electronic means, patient care is enhanced in real-time. When a patient is unable to verbalize information such as medications, allergies, and comorbidities, the ability to share or retrieve data is essential to the patient's health. T2D can improve through interprofessional collaboration, including nurse educators, endocrinologists, patient advocates, and nurses. Through the information gathered through electronic means, specialists, PCP, nurses, and educators can work together to provide the best care possible to individuals in the health care system.

Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health

The AACN Essential VII (AACN, 2006) is clinical prevention and population health for improving the nation's health. Disease prevention is the best avenue to improve health and decrease health care costs. The prevention of diabetes through education and diligence could reduce the prevalence of this pandemic. With millions of new patients diagnosed with diabetes and prediabetes annually, health care costs skyrocket. The cost of medications, quarterly clinic visits, complications, and hospital admissions add millions of dollars in expenses annually. Concentrating on community health programs, prevention, education, and lifestyle changes can make a monumental difference in T2D and other disease processes.

Essential VIII: Advanced Nursing Practice

Finally, AACN's Essential VIII (AACN, 2006) is advanced nursing practice. Advanced practiced nurses are included in this equation, but also the advanced knowledge and health care delivery of all nurses. With the increased complexity of health care over the last several decades comes the need for more advanced knowledge to treat these complicated cases. T2D complications and ever-changing treatments and medications must be studied and implemented

for effective patient care. In addition, the incidences of viruses, medication-resistant bacteria, and complications from disease processes call for a more excellent knowledge. Nurses are educated and trained to assess patients thoroughly and work with other professionals to develop a plan of care to improve patient outcomes.

Recommendations for Future Research

Research continues to evaluate the best practices to treat diabetes patients. It is recommended to continue researching disease processes, education, technology, medications, and lifestyle changes that can improve diabetes outcomes. Increasing the number of participants can lead to more significant findings. Preston et al. (2019) noted that living with T2D is a personal experience, and consideration for what is significant to patients, families, and the public should be included in future research. Future research should concentrate on how to decrease the prevalence of diabetes, improve outcomes, and focus on prevention.

Chapter Summary

DNP graduates are educated to perform comprehensive exams on patients to determine diagnoses and treatment options for the best health care outcomes. Through practical foundations of education for advanced practice nurses, health care delivery can continue to improve. With technology and comprehensive collaboration with other professionals, nurses will implement successful treatment modalities for the best solutions for the patient. Promoting health care prevention and treatment and patient self-care principles will be essential in health care delivery.

T2D is now a pandemic in the United States, with millions of newly diagnosed individuals annually. Using the DNP Essentials, as well as other evidence-based practice modalities, will decrease the prevalence of diabetes. In addition, effective management of diabetes and the focus on prevention will reduce health care costs by millions of dollars annually.

With fewer complications and hospitalizations, wage loss from absences for surgeries and treatments would also significantly decrease.

T2D education with and without family inclusion was evaluated in this project. The findings revealed an overall decrease in HgbA1c levels with the intervention of T2D education. However, teaching with or without family inclusion was not significant enough to effectively determine a preferable delivery method.

Future studies should involve more participants to increase the possibility of more patients responding to the requests. Also, explaining the importance of the data obtained to the patient may increase conformity. A more extended period of lab draws at three-month intervals for up to a year could also improve data. Even with the best intentions, member participation is essential for a successful study, regardless of the findings. The findings in this project were eye-opening, along with the diabetes prevalence and costs. Future studies need to be conducted on diabetes education modalities and their effects on diabetes patient outcomes.

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Appendix A: Diabetes Self-Management Questionnaire (DSMQ)

The following statements describe self-care activities related to your diabetes. Thinking about your self-care over the **last 8 weeks**, please specify the extent to which these statements apply to you. Note: If you monitor your glucose levels using continuous interstitial glucose monitoring (CGM), please refer to this where 'blood sugar checking' is requested.	applies to me very much	applies to me to a considerable degree	applies to me to some degree	does not apply to me
1. I check my blood sugar levels (glucose levels) with care and attention. *☐ Blood sugar (glucose) checking is not required as a part of my self-care.*	☐3	☐2	☐1	☐0
2. The foods I choose to eat make it easy for me to achieve good blood sugar levels.	☐3	☐2	☐1	☐0
3. I regularly see the doctor (diabetes specialist) regarding my diabetes.	☐3	☐2	☐1	☐0
4. I take my diabetes medication (e.g., insulin, tablets) as prescribed/agreed. *☐ Diabetes medication is not required as a part of my self-care.*	☐3	☐2	☐1	☐0
5. Occasionally I eat lots of sweets or other foods rich in carbohydrates.	☐3	☐2	☐1	☐0
6. I keep records of my blood sugar values (or CGM data) to better manage my diabetes. *☐ Blood sugar (glucose) checking is not required as a part of my self-care.*	☐3	☐2	☐1	☐0
7. I tend to avoid seeing the doctor (diabetes specialist) regarding my diabetes.	☐3	☐2	☐1	☐0
8. I am regularly physically active to improve my diabetes/my health.	☐3	☐2	☐1	☐0
9. I follow the relevant dietary recommendations for people with diabetes (e.g., given to me by my doctor or diabetes specialist).	☐3	☐2	☐1	☐0
10. I do not check my blood sugar levels (glucose levels) frequently enough to achieve good glucose control. *☐ Blood sugar (glucose) checking is not required as a part of my self-care.*	☐3	☐2	☐1	☐0
11. I avoid physical activity although it would be good for my diabetes/my health.	☐3	☐2	☐1	☐0

12. I tend to forget or skip my diabetes medication (e.g., insulin, tablets). *☐ Diabetes medication is not required as a part of my self-care.*	☐3	☐2	☐1	☐0
13. Sometimes I have real 'food binges' (not triggered by hypoglycaemia).	☐3	☐2	☐1	☐0
14. Regarding my diabetes, I should see my doctor (diabetes specialist) more often.	☐3	☐2	☐1	☐0
The following statements describe self-care activities related to your diabetes. Thinking about your self-care over the **last 8 weeks**, please specify the extent to which these statements apply to you. Note: If you monitor your glucose levels using continuous interstitial glucose monitoring (CGM), please refer to this where 'blood sugar checking' is requested.	applies to me very much	applies to me to a considerable degree	applies to me to some degree	does not apply to me
15. I am less physically active than would be optimal for my diabetes/my health.	☐3	☐2	☐1	☐0
16. I could improve my diabetes self-care considerably.	☐3	☐2	☐1	☐0
17. I estimate the carbohydrate content of my meals (for achieving better glucose control).	☐3	☐2	☐1	☐0
18. I eat without regard to my diabetes.	☐3	☐2	☐1	☐0
19. I check/discuss my diabetes treatment with the doctor (diabetes specialist) regularly.	☐3	☐2	☐1	☐0
20. My diabetes self-care is poor.	☐3	☐2	☐1	☐0
The following statements describe self-care activities related to intensive insulin treatment and **need only be answered by people using rapid acting insulin** (i.e., all with type 1 diabetes and those with type 2 injecting insulin before the meals). If you *☐ don't use insulin ☐ or use long acting insulin only,* please leave out the following statements.	applies to me very much	applies to me to a considerable degree	applies to me to some degree	does not apply to me
21. I check my blood sugar levels (glucose levels) before each meal.	☐3	☐2	☐1	☐0
22. I adapt my insulin doses to the carbohydrate content of my meals.	☐3	☐2	☐1	☐0
23. I adjust the timing of my insulin injections and food intake.	☐3	☐2	☐1	☐0
24. I adapt my insulin doses to the current blood sugar levels (glucose levels) as well as preceding or planned activities.	☐3	☐2	☐1	☐0

25. I try to ensure regular mealtimes over the day.	☐3	☐2	☐1	☐0
26. I carry fast carbohydrates to enable quick treatment of hypoglycaemia (low blood sugar).	☐3	☐2	☐1	☐0
27. In case of hypoglycaemia (low blood sugar), I take appropriate amounts of carbohydrates to avoid causing hyperglycaemia (high blood sugar).	☐3	☐2	☐1	☐0

Appendix B: Permission to Use DSMQ

ePROVIDE™: You received a message related to Request 2108347
External
eprovide DSMQ questionnaire

a) noreply@mapi-trust.org to me	Fri, June 11, 2021, 12:29 PM

b) Please find below new message(s) regarding your request.

To make sure we'll receive your answer(s), please login to ePROVIDE platform and access the details of your request to reply.

Date	From	Message
2021-06-11 05:29:30	Maggie Martin	Hi Sheryl, Thank you for your interest in the DSMQ - Diabetes Self-Management Questionnaire! As a not-funded academic user, you will not be charged for the use of this questionnaire (https://eprovide.mapi-trust.org/instruments/diabetes-self-management-questionnaire#need_this_questionnaire). You can use Online Distribution to download any available translations of the questionnaire from ePROVIDE. Please refer to the Instructions to download a questionnaire

		for assistance with this process. We ask that you please kindly select the specific language you are looking for (for example English for U.S., Spanish for U.S., etc.). Let me know if you have any trouble by replying directly to my email here. Kind regards, Maggie Martin Client Services Associate II, PCS Tel: +1 xxx xxx xxx xxxxxxx@xxxxxxx.org www.mapi-trust.org,https://eprovide.mapi-trust.org/

Best regards,

ICON plc made the following annotations.

This email transmission may contain confidential or legally privileged information that is intended only for the individual or entity named in the email address. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or reliance upon the contents of this email is strictly prohibited. If you have received this email transmission in error, please reply to the sender, so that ICON plc can arrange for proper delivery, and then please delete the message.

Thank You,

ICON plc
South County Business Park
Leopardstown
Dublin 18
Ireland
Registered number: 145835

Appendix C: Letter of Support From Referring Clinic Owner

May 27, 2022

To Whom It May Concern:

My name is Heather McFarland, and I am a family nurse practitioner and business owner. I have given permission to Sheryl Wright to conduct research on diabetes education with lab data from patients at these facilities. She will provide flyers, diabetes education tests, and diabetes educational videos to these patients and analyze data and the end of the project. A separate IRB approval is not needed from my facility. I am interested to learn what she finds regarding patient education approaches in outpatient clinics.

Sincerely,

xxxxxxxxxxxxxxx, MSN, FNP, BSN, R.N.

Appendix D: Flyer for Recruitments and Project Explanation

Diabetes Family-Inclusion Education in the Outpatient Clinic

Sheryl L. Wright

Research Volunteers

What do you have to do? Allow your primary care provider to release your last HgbA1c and fasting glucose levels and follow-up on time for your next HgbA1c and fasting glucose lab work, releasing that information to me as well.
You will also be given a pre-and post-test to take regarding your understanding of diabetes. You will be provided six videos on diabetes (25-30 minutes each) to watch with directions. What do you get out of it? Free diabetes education provided by me (Sheryl Wright) on diet, exercise, treatment options, complications to look for, and ways to improve daily life with diabetes

- Your information will always be protected – your name will never be linked to the data
- The information will be used for a research study for my Doctor of Nursing program this fall
- Information will be used to help determine the best education approach in outpatient clinics for diabetes patients.

Appendix E: IRB Approval

Karla Perkins	Jun 27, 2022, 4:24 PM (2 days ago)
to Colleen, me, ACU	

Hello Sheryl,

I am pleased to inform you that your study, IRB #22-069, has been approved as Exempt by the ACU IRB! Your *official study documents* are attached. We are in transition in our office currently, and I am unable to get your official Approval Letter signed at the moment. You may begin your data collection based on this email, and I will send your official Approval Letter to you as soon as I am able.

When your study is completed, we ask that you notify us so that we can update our files and issue a data destruction date. Please include your study number (22-069) in the subject line of that email.

We wish you success as you embark on this research adventure!

Blessings,

Karla Perkins
Research Administration Project Manager
IRB Administrator
Abilene Christian University
328 Hardin Administration Bldg
F: xxx-xxx-xxxx

Appendix F: Participant Consent Form

You may be able to take part in a research study. This form provides important information about that study, including the risks and benefits to you as a potential participant Please read this form carefully and ask the researcher any questions that you may have about the study. You can ask about research activities and any risks or benefits you may experience. You may also wish to discuss your participation with other people, such as your family doctor or a family member. Your participation in this research is entirely voluntary. You may refuse to participate or stop your participation at any time and for any reason without any penalty or loss of benefits to which you are otherwise entitled.

PURPOSE AND DESCRIPTION: This research project is being conducted to determine best education practices in outpatient clinics. A pre-test and post-test will be given and lab test results will be received from the primary care provider's office. Hope to learn if family-inclusion diabetes education or participant-only education will improve diabetes outcomes the most.

If selected for participation, you will be asked to watch six diabetes education videos over the course of 3 weeks. Each visit is expected to take 25-30 minutes. During the course of the education provided to you, you will be asked to participate in the following procedures: you will take a pre-test and post-test to determine your diabetes understanding. Your primary care provider will supply me with your most recent HgbA1c and fasting glucose levels. You will return to your primary care provider's office 3 months after your last HgbA1c and fasting glucose levels to have your bloodwork drawn (during your regularly scheduled visit).

Your data will be assigned a de-identifying code by your primary care provider and released to me through an encrypted email.

RISKS & BENEFITS: There are risks to taking part in this research study. Below is a list of the foreseeable risks, including the seriousness of those risks and how likely they are to occur: Risks include your personal information being compromised, but the risk is rare due to your name and other information being de-identified before storing.

There are potential benefits to participating in this study. Such benefits may include improving diabetes education and outcomes, including improved fasting glucose and HgbA1c levels. The researchers cannot guarantee that you will experience any personal benefits from participating in this study.

PRIVACY & CONFIDENTIALITY: Any information you provide will be confidential to the extent allowable by law. Some identifiable data may have to be shared with individuals outside of the study team, such as members of the ACU Institutional Review Board or individuals of xxxxxxxxxxxx. Otherwise, your confidentiality will be protected by encrypted emails and computer programs that ensure privacy.

COLLECTION OF IDENTIFIABLE PRIVATE INFORMATION OR BIOSPECIMENS: Your data, with or without identifiers, will **not** be used for any other research purposes other than those described herein.

CONTACTS: If you have questions about the research study, the lead researcher is Sheryl L. Wright, DNP student at Abilene Christian University and may be contacted at xxx-xxx-xxxx, xxxxxxxx@acu.edu, and/or xxxxxxxxxxx, TN xxxx. If you are unable to reach the lead researcher, or wish to speak to someone other than the lead researcher, you may contact Dr. Colleen Marzilli, PhD, DNP, MSN, MBA, BSN; phone xxx-xxx-xxxx, and email xxxxxx@acu.edu. If you have concerns about this study, believe you may have been injured

because of this study, or have general questions about your rights as a research participant, you may contact ACU's Chair of the Institutional Review Board and Executive Director of Research, Megan Roth, Ph.D. Dr. Roth may be reached at
(xxx) xxx-xxxx
xxxxxxx@acu.edu
328 Hardin Administration Bldg, ACU Box 29103
Abilene, TX 79699

HIPAA AUTHORIZATION: Your name (on signed consents) and date of birth (to verify you are over 40 years of age) will be obtained from your primary care provider. Your lab values for your last fasting glucose and HgbA1c level will be received from your primary care provider, along with your next scheduled fasting glucose and HgbA1c levels. Your information will be de-identified by your primary care provider by assigning a code with a combination of letters and numbers before releasing lab values. The information will be sent through encrypted emails, and stored in an encrypted file for a period of 3 years. You have the right to refuse or revoke authorization. Accidental disclosure of information risk is minimal due to de-identifying personal information and encrypted files.

There are 30 expected participants to be enrolled in this study.
Your participation may be ended early by the researchers for certain reasons. For example, we may end your participation if you no longer meet study requirements, the researchers believe it is no longer in your best interest to continue participating, you do not follow the instructions provided by the researchers, or the study is ended. You will be contacted by the researchers and given further instructions in the event that you are removed from the study.
Clinical results will be provided to the primary care providers at xxxxxxxxxxxxx. You are able to ask the clinic for this information by September 1, 2022.
Please let the researchers know if you are participating in any other research studies at this time.

Please sign this form if you voluntarily agree to participate in this study. Sign only after you have read all of the information provided and your questions have been answered to your satisfaction. You should receive a copy of this signed consent form. You do not waive any legal rights by signing this form.

_____	_____	
Printed Name of Participant	Signature of Participant	Date
_____	_____	
Printed Name of Person Obtaining Consent	Signature of Person Obtaining Consent	Date

Appendix G: Project Timeline

Project Events	Aug - 20	Sep - 20	Jan - 21	Feb - 21	Mar - 21	Apr - 21	May - 21	Jun - 21	Jul - 21	Sep - 21	May - 22	Jun - 22	Jul - 22	Aug - 22	Sep - 22
Develop POI															
PICOT															
Theoretical Framework															
Literature Review															
IRB Training															
Clinical Log															
Chapter 1															
Chapter 2															
Chapter 3															
Survey Tool Permission															
Defend project proposal															
IRB approval from ACU															
Analyze data															
Chapter 4															
Chapter 5															
Submit full paper to NURS 754															
Submit the paper to NURS 755															
Final defense															